

**DATA EVALUATION RECORD
VEGETATIVE VIGOR EC₂₅ TEST
§122-1(b) (TIER I)**

1. **CHEMICAL**: Pyraclostrobin

PC Code No.: 099100

2. **TEST MATERIAL**: BAS 500 00 F

Purity: 24.3%

3. **CITATION**:

Author: J. Aufderheide

Title: Effect of BAS 500 00 F on Vegetative Vigor of Selected
Non-Target Terrestrial Plants (Tier I)

Study Completion Date: October 18, 2001

Laboratory: ABC Laboratories, Inc.
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Sponsor: BASF Corporation
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Research Triangle Park, NC 27709

Laboratory Report ID: 46888; 66868 (BASF Study Number)

MRID No.: 45531102

DP Barcode: D290364

4. **REVIEWED BY**: Rebecca Bryan, Staff Scientist, Dynamac Corporation

Signature:

Date: 2/15/04

APPROVED BY: Teri Myers, Ph.D., Staff Scientist, Dynamac Corporation

Signature:

Date: 2/15/04

5. **APPROVED BY**: Lewis Brown, OPP/EFED/ERB

Signature:

Lewis R Brown

Date: 02/22/2005



6. STUDY PARAMETERS:

Scientific Name of Test Organism: Dicots: *Brassica oleracea*, *Daucus carota*,
Cucumis sativus, *Lactuca sativa*, *Glycine max*,
Lycopersicon esculentum
Monocots: *Zea mays*, *Avena sativa*, *Allium cepa*,
Lolium perenne

Definitive Study Duration: 14 days

Type of Concentrations: Nominal

7. CONCLUSIONS:

Shoot height and dry weight were studied on 10 plant species after post-emergent application of Pyraclostrobin, as BAS 500 00 F in a Tier I study. Test species included carrot, cabbage, cucumber, lettuce, soybean, tomato, corn, oat, onion, and ryegrass.

The test was performed at a rate of 0.50 lbs a.i./A (calculated 0.53 lbs a.i./A). Tomato was also tested at 0.25 lbs a.i./A (calculated 0.26 lbs a.i./A). No species or endpoint exhibited sensitivity to treatment (i.e., exhibited a reduction which exceeded 25%); however, a NOAEC could not be determined for carrot, cabbage, and cucumber and, because this was a Tier I study, an EC₀₅ could not be determined for these species and endpoints.

This study is classified as CORE. This study is scientifically sound and fulfills the guideline requirements (Subdivision J, §122-1 (a; TIER I)) for a seedling emergence study.

Most sensitive monocot: N/A

Most sensitive endpoint: N/A

EC₀₅: 0.53 (corn)

EC₂₅: >0.53 lbs a.i./A

NOAEC: 0.53 lbs a.i./A (all species)

Most sensitive dicot: N/A

Most sensitive endpoint: N/A

EC₀₅: <0.53 (carrot, cabbage, cucumber, and lettuce)

EC₂₅: >0.53 lbs a.i./A

NOAEC: <0.53 lbs a.i./A (carrot, cabbage, and cucumber)

8. ADEQUACY OF THE STUDY:

A. Classification: Core

B. Rationale: This study fulfills the US EPA guideline requirements for vegetative vigor studies (Subdivision J, §122-1 (b; TIER I)).

C. Repairability: None

9. GUIDELINE DEVIATIONS:

None.

10. SUBMISSION PURPOSE: This study was submitted to provide data on the phytotoxicity of post-emergent application of BAS 500 00 F to non-target terrestrial plants for the purpose of chemical registration.

11. MATERIALS AND METHODS:**A. Test Organisms**

Guideline Criteria	Reported Information
Species: 6 dicots in 4 families, including soybean and a rootcrop; 4 monocots in 2 families, including corn.	<u>Dicots:</u> carrot, cabbage, cucumber, lettuce, soybean, tomato <u>Monocots:</u> corn, oat, onion, and ryegrass
Number of plants per repetition:	<u>Corn, cucumber, and soybean:</u> 1 plant per replicate, five pot per replicate <u>Tomato:</u> 2 plants per replicate, three pots per replicate <u>Carrot, cabbage and lettuce:</u> 3 plants per replicate, two pots per replicate <u>Oat, onion, and ryegrass:</u> 5 plants per replicate, one pot per replicate
Source of seed and historical % germination of seed:	See Appendix B, p. 37 for seed source information; the germination rates were 82-98%.

B. Test System

Guideline Criteria	Reported Information
Solvent:	None
Site of test:	Performed in environmentally regulated greenhouses at ABC Laboratories.
Planting method/type of pot:	Square plastic pots measuring 10-cm x 10-cm x 12-cm.
Method of application:	Spray booth with moving spray head.
Method of watering:	Bottom-watered every 1-2 days during testing (p. 21).
Growth stage at application:	Seedlings (1-2 leaf stage)

C. Test Design

Guideline Criteria	Reported Information
Dose range: 2x or 3x	N/A
Doses: At least 5	0.50 g a.i./ha (calculated 0.53 lbs a.i./A); Tomato also tested at 0.25 lbs a.i./A (calculated 0.26 lbs a.i./A).
Controls: Negative and solvent	Negative control
Replicates per dose: At least 3	4 replicates
Test duration: 14 days	14 days
Were observations made at least weekly?	Weekly observations
Maximum dosage rate:	3,130 mg a.i./L (p. 17).

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Was a NOAEC observed for each species?¹	No; a NOAEC was not determined for carrot, cabbage, and cucumber (see footnote at the bottom of table)
Phytotoxic observations:	Scale of 0-100 with 100 indicating maximum effect (100% mortality).
Were initial chemical concentrations measured? (Optional)	Yes, the Tier I test concentration was measured.
Were adequate raw data included?	Individual plant data were provided.

¹ Tier I terrestrial plant tests do not require the establishment of a NOAEC or LOAEC

Results for the most sensitive parameter of each species**Results Synopsis****Tier I**

Crop	Survival		Shoot length		Dry weight		Most sensitive parameter
	NOAEC ¹	EC ₂₅	NOAEC ¹	EC ₂₅ ¹	NOAEC ¹	EC ₂₅ ¹	
Cabbage	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Carrot	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Corn	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Cucumber	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Lettuce	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Oat	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Onion	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Ryegrass	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Soybean	0.53	>0.53	0.53	>0.53	0.53	>0.53	None
Tomato	0.53	>0.53	0.53	>0.53	0.53	>0.53	None

¹ Units are lbs a.i./A.Morphological Observations**Tier I**

Carrot: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -8% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -22% different from the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Cucumber: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -4% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -

15% different from the control.

By 14 days, there was no significant effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Lettuce: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -5% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -7% different from the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Cabbage: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -6% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -13% different from the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Soybean: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were 4% greater than the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were 6% greater than the control.

By 14 days, there was no significant effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Tomato: Survival in the control and the 0.26 and 0.53 lbs a.i./A treatment groups were 100%.

The mean shoot lengths for the 0.26 lbs a.i./A treatment group were 7% greater than the control. The mean shoot dry weights for the 0.26 lbs a.i./A treatment group were 16% greater than the control. The mean shoot lengths and the mean dry weights for the 0.53 lbs a.i./A treatment group were 4% greater than the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Corn: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -5% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -8% different from the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Oat: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were 2% greater than the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were -1% different from the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Onion: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were 8% greater than the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were 6% greater than the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Ryegrass: Survival in the control and the 0.53 lbs a.i./A treatment group was 100%.

The mean shoot lengths for the 0.53 lbs a.i./A treatment group were -3% different from the control. The mean shoot dry weights for the 0.53 lbs a.i./A treatment group were 6% greater than the control.

By 14 days, there was no effect on the phytotoxicity ratings in the 0.53 lbs a.i./A treatment group compared to the control.

Statistical Results

Statistical Method: The equation used for calculating the emergence, survival, and growth percent differences is found on page 16. The NOAEC and EC₂₅ were estimated using the percent difference data.

Tier IEC₀₅: Not reportedEC₂₅: >0.53 lbs a.i./A

NOAEC: 0.53 lbs a.i./A

13. REVIEWER'S VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: When inhibition exceeded 5%, data for plant height and dry weight were analyzed to determine the NOAEC values using a Student's t-test to compare the treatment group to the control (treatment group means and p-values are provided in Excel spreadsheets in "raw data files"). Inhibition in this study did not exceed 25%, so the EC₂₅ values could be determined visually.

Results synopsis**Tier I**

Species	Shoot height			Dry weight			Most Sensitive Parameter
	NOAEC ¹	EC ₀₅ ¹	EC ₂₅ ¹	NOAEC ¹	EC ₀₅ ¹	EC ₂₅ ¹	
Cabbage	0.53	<0.53	>0.53	<0.53 ^a	<0.53	>0.53	None
Carrot	<0.53 ^a	<0.53	>0.53	<0.53 ^a	<0.53	>0.53	None
Corn	0.53	0.53	>0.53	0.53	0.53	>0.53	None
Cucumber	0.53	>0.53	>0.53	<0.53 ^a	<0.53	>0.53	None
Lettuce	0.53	0.53	>0.53	0.53	<0.53	>0.53	None
Oat	0.53	>0.53	>0.53	0.53	>0.53	>0.53	None
Onion	0.53	>0.53	>0.53	0.53	>0.53	>0.53	None
Ryegrass	0.53	>0.53	>0.53	0.53	>0.53	>0.53	None
Soybean	0.53	>0.53	>0.53	0.53	>0.53	>0.53	None
Tomato	0.53	>0.53	>0.53	0.53	>0.53	>0.53	None

¹ All NOAEC and EC₂₅ values are reported in lbs a.i./A.

^a The value determined by the reviewer was lower than the value reported by the study authors.

Most sensitive monocot: N/A

Most sensitive endpoint: N/A

EC₀₅: 0.53 (corn)

EC₂₅: >0.53 lbs a.i./A

NOAEC: 0.53 lbs a.i./A (all species)

Most sensitive dicot: N/A

Most sensitive endpoint: N/A

EC₀₅: <0.53 (carrot, cabbage, cucumber, and lettuce)

EC₂₅: >0.53 lbs a.i./A

NOAEC: <0.53 lbs a.i./A (carrot, cabbage, and cucumber)

14. REVIEWER'S COMMENTS:

With the exception of the NOAEC for carrot, cabbage, and cucumber (which could not be determined by the reviewer's analysis), the reviewer's conclusions were similar to those of the study authors; no species exhibited sensitivity to treatment with BAS 500 00 F (Pyraclostrobin), as defined by inhibition exceeding 25%. Carrot, cabbage, and cucumber should be re-tested at a range of levels lower than that tested in this study to determine both a NOAEC and an EC₀₅ for these species.

This study was conducted in accordance with USEPA Good Laboratory Practice Standards; Pesticide Programs (40 CFR, Part 160). The study includes a Quality Assurance statement.

15. REFERENCES

Organization for Economic Cooperation and Development. 1997. Decision of the Council, Revised Principles of GLP [C(97) 186/ Final].

U.S. Environmental Protection Agency-1982. Pesticide Assessment Guidelines. Subdivision J, Hazard Evaluation: Non-Target Plants.-1996. OPPTS 850.4150.

U.S. Environmental Protection Agency. 1986. Hazard Evaluation Division. Standard Evaluation Procedure. Non-Target Plants: Seed Germination/Seedling Emergence and Vegetative Vigor-Tiers 1 and 2.

Draft Rejection Rate Analysis: Ecological Effects, Special Review and Registration Division and Environmental Fate and Effects Division, February, 1994.